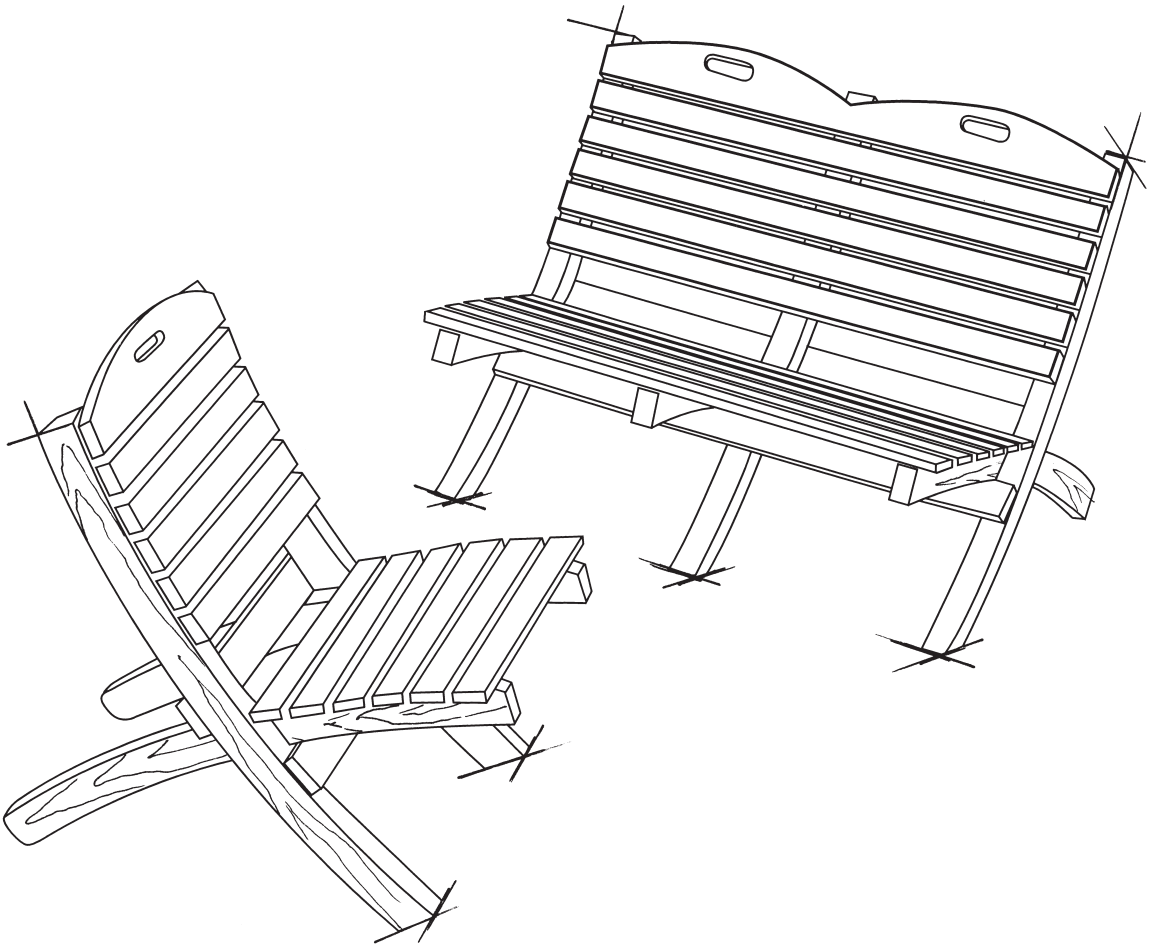
WOODWORKS: INTERMEDIATE PROJECT

PATIO CHAIR AND LOVE SEAT



This lightweight, easy-to-build outdoor furniture can bring contemporary flair to a deck, patio or balcony. And these chairs are as easy to store as they are to relax in.

- With their interlocking legs, both the chair and the love seat can be quickly dismantled or "knocked down" for storage without tools. The seat section is simply pulled out and can be neatly tucked behind the back section. The top slat also has a handle hole for easy carrying.

- The chairs were designed to be made with Western cedar because it's both lightweight and strong.

These chairs give intermediate woodworking students the opportunity to learn a number of important, basic skills, including templating, measuring, cutting, marking, drilling and gluing. And after you make one or both of the chairs, you'll learn how to protect the wood and keep it looking beautiful.

TOOLS REQUIRED

Hand Tools
– Files
– Combination square
– Carpenter's square
– Screwdriver

Power Tools
– Table saw
– Jigsaw
– Belt sander
– Electric drill
– Power screwdriver or screwdriver bits for drill

Miscellaneous
– Pencil
– Permanent marker, fine point
– Safety glasses

WOOD BUYING LIST

Chair

2x6 x 8′ D and better grade cedar	2
1x6 x 8′ D and better grade cedar	2
1/8″ x 24″ x 48″ hardboard for templates	1
2″ galvanized deck screws	80

Love seat

2x6 x 8′ D and better grade cedar	3
1x6 x 8′ D and better grade cedar	4
1/8″ x 24″ x 48″ hardboard for templates	1
2″ galvanized deck screws	120

CUTTING LIST

Chair

Key	Pcs.	Description
A	2	1-1/2″ x 5-1/2″ x 36″ cedar (back legs)
B	2	1-1/2″ x 4-15/16″ x 34″ cedar (seat legs)
C	1	3/4″ x 4″ x 20″ cedar (top slat)
D	2	3/4″ x 2-1/2″ x 20″ cedar (seat supports)
E	11	3/4″ x 2″ x 20″ cedar (slats)

Love seat

Key	Pcs.	Description
AA	3	1-1/2″ x 5-1/2″ x 36″ cedar (back legs)
BB	3	1-1/2″ x 4-15/16″ x 34″ cedar (seat legs)
CC	1	3/4″ x 4″ x 40″ cedar (top slat)
DD	2	3/4″ x 2-1/2″ x 40″ cedar (seat supports)
EE	11	3/4″ x 2″ x 40″ cedar (slats)

WOOD FINISHING PRODUCTS

Recommended finish
Thompson's® Water Seal® Clear Wood Protector, 1 gallon*

Alternate finish
Thompson's® Water Seal® Tinted Wood Protector Sheer Honey Gold. Also available in Sheer Natural Cedar, Sheer Rustic Red, Sheer Nutmeg Brown and Sheer Coastal Gray**

Miscellaneous
Gloves
Plastic drop cloths
Brush, roller, applicator pad, deck sprayer or pump-up garden sprayer
Mineral spirits (for cleanup)
Rags

* *1 gallon of Thompson's® Water Seal® Clear Wood Protector will protect a number of chairs and/or love seats, so product can be shared among several students. Figure 300-400 square feet per gallon.*

** *1 gallon of Thompson's® Water Seal® Tinted Wood Protector will protect a number of chairs and/or love seats, so product can be shared among several students. Figure 250-300 square feet per gallon.*

BEFORE YOU BEGIN

Good craftsmanship begins and ends with good work habits, so make the following steps part of your routine workshop practice. If you have any doubts or questions about how to proceed with a project, always discuss them with your shop instructor.

- Carefully and fully review plans and instructions before putting a tool to the project lumber.
- Work sensibly and safely. Wear safety goggles when doing work that creates flying chips and sawdust; wear the appropriate mask or respirator whenever making sawdust or working with thinners or other solvents.
- At the end of every work session, clean up your shop area and put away all portable tools.

CUTTING AND ASSEMBLY PROCEDURE

Refer to the project illustration shown on page 6.

Making the seat and back-leg templates

Whenever you need to use a shape for more than one piece, it's best to make a template. To start your templates for these chairs, refer to the "Top-Slat Grid" and the "Back- and Seat-Leg Grid" on the measured drawing. We've drawn half of the entire shapes on those grids because both halves are symmetrical. You'll thus be making one template for half of the shape and use it to draw the entire shape. Also, because the shape of the seat leg is so similar to the back leg, you can use the back-leg template to make the seat-leg template.

You will transfer the dimensions from the grids when you lay out the full-size templates. The shapes will become full size once you draw a grid of 1″ x 1″ squares on the hardboard and then transfer the shapes to it. Here's how to proceed:

1. Cut a piece of 1/8″-thick hardboard to 6″ x 18″.
2. Measure and mark 1″ increments on both ends and along one side.
3. Draw the grid lines across the width using a combination square and the marks you just drew. It's hard to see pencil lines on hardboard, so use a fine-point permanent marker to draw the lines.
4. Draw the grid lines across the length.
5. Transfer the points where the seat and back-leg shapes intersect the grid in the measured drawing to the grid on your hardboard.
6. Draw lines connecting the points that you just drew. Use a 25-cent piece to trace the 1/2″ radiuses at the bottom of the leg. Now the template is full size.
7. Cut out the template with a jigsaw and smooth the sawn edges with sandpaper.
8. Draw centerlines that divide the length on the back-leg pieces (A and AA). Align the back-leg template to the center line and the bottom corner of the cedar board. Trace around the template. Flip the template over the centerline of the board, and trace the rest of the back-leg shape.
9. Make the seat-leg template by tracing the back-leg template shape onto another piece of hardboard. Then draw the shape of the seat leg inside the back-leg shape. Cut out the shape and you'll have a separate seat-leg (B and BB) template.
10. Using the same procedures described above, make the top-slat (C and CC) template.

Making the chair

1. Cut all the pieces (A through E) to the dimensions given in the Cutting List: Chair. For the legs and seat supports (A, B and D), avoid using any pieces of cedar containing knots, which can weaken the wood.

Woodworker's Tip:
Be careful when you handle the cut pieces. Until the edges are smooth, you can easily pick up a splinter from the cedar.

2. Using the back- and seat-leg templates and the top-slat templates, trace the shapes onto the cedar pieces.
3. Cut out the seat (A), back-leg (B) and top-slat (C) shapes with a jigsaw and sand the edges smooth and free of splinters. Sand the curved edges of the legs with a belt sander.
4. Lay out the hand-grip hole in the top slat (C). To form the ends of the hand grip, drill holes with a 1″ spade bit. Drill in from both sides so you won't tear out the wood. Cut the rest of the hole with a jigsaw and smooth the inside with a file and sandpaper.
5. Lay out, countersink and drill all the screw holes for the slats and supports.
6. Finish-sand all the pieces with 120-grit paper, followed by 150-grit paper. Round over any sharp edges with the sandpaper.

Woodworker's Tip:
Cedar is soft, so when screwing the pieces together, finish driving the screws by hand to avoid setting the heads too deep.

7. Start assembling the chair by screwing the seat supports (D) to the back legs (A). Align the pieces using the dimensions given in the measured drawing. Use a carpenter's square to align the seat supports at a 90-degree angle to the back legs, then drive in the screws. Also, measure and maintain the distance between the legs as you attach each seat support. Use this method again when you attach the slats (E).
8. Align and screw the top slat (C) to the back legs (A). Then attach five slats (E) to the back legs. Attach the other six slats (E) to the seat legs (B) as shown in the measured drawing. To maintain equal spacing between the slats, use a 1/2″-thick spacer to align them. Finish driving the screws by hand to avoid setting their heads too deep.
9. Important: Before applying the wood protector, unscrew the seat supports (D), apply a weather-resistant glue to the joints, then screw the seat supports back onto the back legs. The glue will strengthen the joint. The chair relies primarily on the seat supports for its strength.

Making the love seat

1. The steps for making the love seat are essentially the same as those for the chair except for a few key differences.
2. An additional back leg (AA) and seat leg (BB) must be cut out from the templates.
3. The top slat (CC), the seat supports (DD) and all the seat and back slats (EE) are all twice as long as those for the chair (parts C, D and E).

PROTECTING YOUR PROJECT

The use of cedar for outdoor furniture requires application of waterproofing protection immediately after completion to protect the wood from water damage. We've chosen Thompson's® Water Seal® Clear Wood Protector to provide complete protection for your project. It not only prevents water damage, but the coating also resists mildew and U.V. (ultraviolet radiation in sunlight) damage, and exceeds industry standards for waterproofing on wood. In addition, Clear Wood Protector will help maintain the natural cedar color of your wood.

Woodworker's Tip: *Always be sure to choose a waterproofer that claims it exceeds industry standards for waterproofing on wood.*

1. Before applying Clear Wood Protector, read and follow the directions found on the back of the can. Be sure that both surface and air temperature are above 50° F. during application and for 48 hours after application, and do not apply product if rain is forecasted within 24 hours of application.
2. The surfaces must be free of all dust, dirt, oil, soot, grease and other contaminants. If the surface is damp or wet from cleaning or weather, allow the surface to dry thoroughly (a minimum of 48 hours) before application.
3. Move all objects that could come in contact with overspray. Overspray of product onto glass should be removed immediately with paint thinner or mineral spirits.
4. When you apply Clear Wood Protector, do not mix it with other waterproofing products because variations in the final appearance of the surface being treated may result. Also, do not thin this product.
5. In most applications, only one light coat is necessary. Apply with a brush, roller, applicator pad or sprayer. Regardless of which application method is used, remove excess within 15 minutes by redistributing it to drier areas or wiping it off with a rag.
6. Use only with adequate ventilation. Oiliness and tackiness will result if Clear Wood Protector is over-applied or applied to wet or damp surface or if overnight temperature falls below 50° F. within 48 hours of application. Excessive oiliness caused by over-application may be removed by scrubbing wood with a concentrated degreaser.
7. Allow at least 48 hours to dry. Drying time will vary depending on temperature and humidity.
8. Clean brushes and equipment with mineral spirits, then rinse with clean water.

NOTE: The length of protection will vary depending on environment. Perform the splash test once a year to see whether reapplication is necessary. Sprinkle water on various sections of surface to be sealed. If water absorbs and darkens color of wood within 5 seconds, the surface is porous and considered ready to be treated. If water beads up or otherwise sits on top of surface, then surface doesn't need protection at this time. For maximum protection from color change and other damage caused by the sun, reapplication is recommended every year. Vertical and horizontal surfaces will experience color changes at different rates.

ALTERNATE FINISH

If you decide to bring more color to your project, you can use Thompson's® Water Seal® Tinted Wood Protector, which provides all the benefits of Clear Wood Protector with the addition of sheer color. We've chosen Sheer Honey Gold for this project, but you can choose from five Tinted Wood Protector colors.

1. Before applying Tinted Wood Protector, be sure that both surface and air temperature are above 50° F. during application and for 48 hours after application. Do not apply product if rain is forecasted within 24 hours of application.
2. The surfaces must be free of all dust, dirt, oil, soot, grease and other contaminants. If the surface is damp or wet from cleaning or weather, allow the surface to dry thoroughly (a minimum of 48 hours) before application.
3. Move all objects that could come in contact with overspray. Overspray of product onto glass should be removed immediately with paint thinner or mineral spirits.
4. When you apply Tinted Wood Protector, do not mix it with other waterproofing products because variations in the final appearance of the surface being treated may result. Also, do not thin this product.
5. Shake well; intermix all cans of the same color to be used to assure color uniformity.
6. Only one light coat is necessary in most applications; however, a second coat may be applied if darker color is desired (apply approximately 12 hours after completing the first coat). Apply with a brush, roller or sprayer. Regardless of which application method is used, remove excess within 15 minutes by redistributing it to drier areas or wiping it off with a rag.
7. Use only with adequate ventilation. Oiliness and tackiness will result if over-applied or applied to wet or damp surface or if overnight temperature falls below 50° F. within 48 hours of application.

IMPORTANT: Place rags, steel wool and waste immediately after use in a sealed water-filled metal container.

8. Allow at least 48 hours to dry. Drying time will vary depending on the temperature and humidity.

NOTE: The length of protection will vary depending on environment. Perform the splash test once a year to see whether reapplication is necessary. Sprinkle water on various sections of surface to be sealed. If water absorbs and darkens color of wood within 5 seconds, the surface is porous and considered ready to be treated. If water beads up or otherwise sits on top of surface, then surface doesn't need protection at this time. For maximum protection from color change and other damage caused by the sun, reapplication is recommended every year. Vertical and horizontal surfaces will experience color changes at different rates.

PRODUCT SAFETY
Contents are COMBUSTIBLE. Keep away from heat and open flame.

Contains ALIPHATIC HYDROCARBONS.

VAPOR HARMFUL. Use only with adequate ventilation. To avoid overexposure, open windows and doors or use other means to ensure fresh air entry during application and drying. If you experience eye watering, headaches, or dizziness, increase fresh air, or wear NIOSH-approved respiratory protection or leave the area.

Avoid contact with eyes and skin. Wash hands after using. Keep container closed when not in use. Do not transfer contents to other containers for storage.

FIRST AID: In case of eye contact, flush thoroughly with large amounts of water for 15 minutes and get medical attention. For skin contact, wash thoroughly with soap and water. In case of respiratory difficulty, provide fresh air and call physician.

If swallowed, get medical attention immediately.

DELAYED EFFECTS FROM LONG-TERM EXPOSURE.
Contains solvents which can cause permanent brain and nervous system damage. Intentional misuse by deliberately concentrating and inhaling the contents can be harmful or fatal.

WARNING: This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

DO NOT TAKE INTERNALLY. KEEP OUT OF THE REACH OF CHILDREN.

SAFE DISPOSAL OF RAGS AND WASTE.
Rags, steel wool, or waste soaked in Thompson's® Water Seal® Tinted Wood Protector may spontaneously catch fire if improperly discarded. Immediately after use, place rags, steel wool, or waste in sealed, water-filled metal container. Dispose in accordance with local fire regulations.

PATIO CHAIR AND LOVE SEAT